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Software Engineering Institute

Pittsburgh, PA 15213-3890

Life Cycle Software Engineering Center

Preliminary Insights Working with CMMI in Small Organizations

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NDIA CMMI User's Conference
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Experience Working with Small Organizations

All team members have experience supporting process improvement with small organizations

SuZ Garcia:

- Worked for 3 years in a 20 person software development company, with many roles including PI support
  - Deployed our products and PI services to small (less than 50 software engineers) and larger orgns
- Supported TIDE demo projects, working with small manufacturing companies ranging from 15 to 200
- Working on CMMI-SME pilot team in Huntsville, AL with 2 small (less than 100 people) organizations with even smaller (less than 20 people) projects

Topics

- Why Do Small Businesses Care About CMMI?
- CMMI Challenges/Advantages for Small Companies
- CMMI-SME Pilot Project
- Preliminary Observations
- Summary/Resources

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Why Do Small Businesses Care About CMMI?

The need for operational effectiveness/efficiency increases as the size of the company grows

- Communicating among 5 employees is different than among 30, 50, 100, 200.....
  - CMMI provides a tested practices framework that can help in decision making about what/how to explicitly define, communicate, and improve

When partnering/subcontracting with larger companies, the expectation for CMMI-adherent practices is increasing

- One of our pilot candidates (100 person company) showed us a letter from one of their primes “encouraging” CMMI-based improvement
- Some primes are “pushing down” contract requirements for CMMI-based appraisals/improvement

When independently bidding on some government business, CMMI-based appraisals/improvement are required

Advantages/Disadvantages of Small Companies Doing PI

3 Major Elements Involved in CMMI-based Improvement:

- Appraisal
- Process Definition/Infrastructure Support
- Process Deployment

Larger companies typically have a resource (though not necessarily skill(!)) advantage with Appraisal and Definition, but have a distinct *disadvantage* in deployment

Smaller companies typically have disadvantage with resources for appraisal and definition, but have a distinct *advantage* in deployment

The Appraisal Challenge

"Official" CMMI appraisals (called SCAMPI A Appraisals) consume a larger percent of the budget for a small company than a large one

- $ to hire lead appraisers
- Time away from work for staff to be interviewed
- Time away from work for internal appraisal team

Mitigation suggestions for small businesses:

- Find/get involved with the DoD Mentoring program with a company that has internal appraisal resources or partner with a prime who has internal appraisal resources and arrange for them to do your appraisal as part of your relationship
- Use less expensive methods (lots of consultants have them) to do a "pre-appraisal" to be sure that your money for a SCAMPI A will be worth your while
- "Welcome" customers to perform an appraisal (when you're ready) on you, with stipulation that you get access to the results so you can use to aid your improvement

The Process Definition/ Infrastructure Challenge

Defining/redefining processes to adhere to CMMI goals requires

- Model knowledge
- Process definition knowledge/skills
- Knowledge of the organization/company

Many large organizations have all 3; most small organizations are missing the model knowledge at least, and often the process definition knowledge and skills

Mitigation suggestions:

- Use DoD Mentoring relationship to build knowledge and skills needed
- Watch for SEI and other industry publications on implementing CMMI for Small Businesses – I expect several to come out over the next couple years
- If not pressured to implement CMMI fast, take one Process Area per month and read it, connect it to your business issues, and see if you can find simple changes to your existing practices that would adhere to the model and give you more benefit than your current practice (note: there are more books coming out for CMMI "beginners", eg *CMMI Distilled* by Ahern et al)

The Deployment Challenge

The Challenge for Large Organizations:

- The larger the organization and the greater the variety of business contexts, the more difficult it is to find the “right” level of standard processes/tailoring guidelines
- Often deployment is not only multi-project, but multi-site and multi-customer type

The Challenge for Small Organizations:

- “The customer rules” – Many small organizations adopt/adapt their business practices directly from their customers or primes
- Some people self-select into small businesses because they want to “do their own thing” rather than follow corporate norms

Mitigation suggestions:

- Just like with large organizations, *demonstrating your ability to deliver what the customer wants* using your local business practices usually keeps them from forcing their practices on you
- Depending on the number of customer contexts, may want to create a standard process for each customer type as your starting point

The Deployment *Advantage* of Small Businesses

The complexity and cost of training employees, creating/using metrics, deploying new templates and job aids is MUCH smaller for small companies than large

- Even approaches like “one on one” sessions incorporated into other meeting contexts is feasible in small businesses
- People who work in small businesses are often, by definition, more flexible than those who have worked a long time in large companies
  - Adopting new practices isn’t as much of a challenge for them

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HSV CMMI-SME Pilots:
Project Goals

- Work with at least 2 small companies
- Exercise at least 3 CMMI Process Areas (the major way topics are organized in the model) in each orgn
- Codify recommendations for how to package, sell, appraise, train, implement CMMI for SME's, to the extent reasonable based on our pilots
- Be able to articulate business case for small companies to adopt CMMI
- Generate "follow-on" path to extend initial pilots
- Present project results at SE2 2004 and the Annual CMMI User Technology Conference
- Provide SEI CMMI-related projects w/appropriate change requests/feedback

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HSV CMMI-SME Pilots:
Pilot Companies Characteristics

- Both pilots are involved in product development for Government or engineering services to support product development
- One pilot company has a manufacturing element
- One pilot SME is a HUBZone company
- Both have recent experience with ISO 9000

Companies selected via formal process administrated by HSV Chamber of Commerce, SEI, and Core SME Team

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HSV CMMI-SME Pilots:
Approach

1) Workshop to provide baseline CMMI knowledge and connect CMMI to their business problems

2) Adaptation of SCAMPI B/C appraisal to map details of CMMI to their current practice in Process Areas selected by them to be high impact to their business

3) Monthly face to face meetings to provide tutorials as needed, work product review, tactical guidance

4) Weekly telecons to keep teams in touch

5) Post-implementation appraisal planned to determine extent of adoption of new practices

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Preliminary Observations

- Minimal training in the CMMI gives enough of sense of the model to nicely connect to the business – do not have to have the 3 day course
- The collaborative “mini-appraisal” during the Gap Analysis session provided specific insight into how the model can be implemented to add value to the organization
- Experience with the ISO 9000 is very helpful but does not substitute for knowledge and understanding of the CMMI
  - ISO terminology differs from CMMI terminology
- The ISO experience sensitized one company with the importance of a measurement program – they were excited to find the guidance in CMMI
- The major challenge for the pilots is making the time to define and pilot improved processes
  - But where the business benefit is clear, the time is found

Having external expertise available “just in time” is a significant enabler to the organizations

Summary/Resources

Our knowledge of how CMMI can work well in small businesses is growing, though probably not fast enough for the level of interest that has been expressed!

More resources to support small business CMMI use are becoming available—check these resources occasionally for new material:

- www.sei.cmu.edu/cmmi -- for lots of links to CMMI information and the model content
- www.ndia.org – find the CMMI section and look at the events (for example, the NDIA Annual CMMI User's Conference is in Denver Nov 17-21, 2003)
- www.sei.cmu.edu/ttp -- for this presentation and others written by SuZ Garcia on this subject
- www.sei.cmu.edu/publications -- for technical reports and notes related to CMMI

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Backup Slides

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SME-Pilot Events/Activities

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Site Kickoff Meeting	Gap Analysis Session	Monthly Working Sessions	Weekly Teleconferences

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- Presented a CMMI Overview Tutorial that covered Level 2 & 3 and focused upon the typical business impacts related to the area
- Conducted Business Analysis to capture high impact Process Areas for the company
  - Had simple “thumbs-up” voting technique to determine level impact
  - Also polled participates for the level of impact (H M L)
  - The high impact areas jumped out and for each company it was easy to select the Process Areas to focus on for the pilot

SME-Pilot Events/Activities

Site Kickoff Meeting	Gap Analysis Session	Monthly Working Sessions	Weekly Teleconferences

- The Process Areas each company selected:
  - Project Planning, Requirements Management, Measurement & Analysis (ASI)
  - Project Planning, Requirements Management, Project Monitoring & Control (Cirrus)
- Decided that even though not selected; informally working on OPF to help establish/sustain PI infrastructure after pilot is complete

SME-Pilot Events/Activities

Site Kickoff Meeting

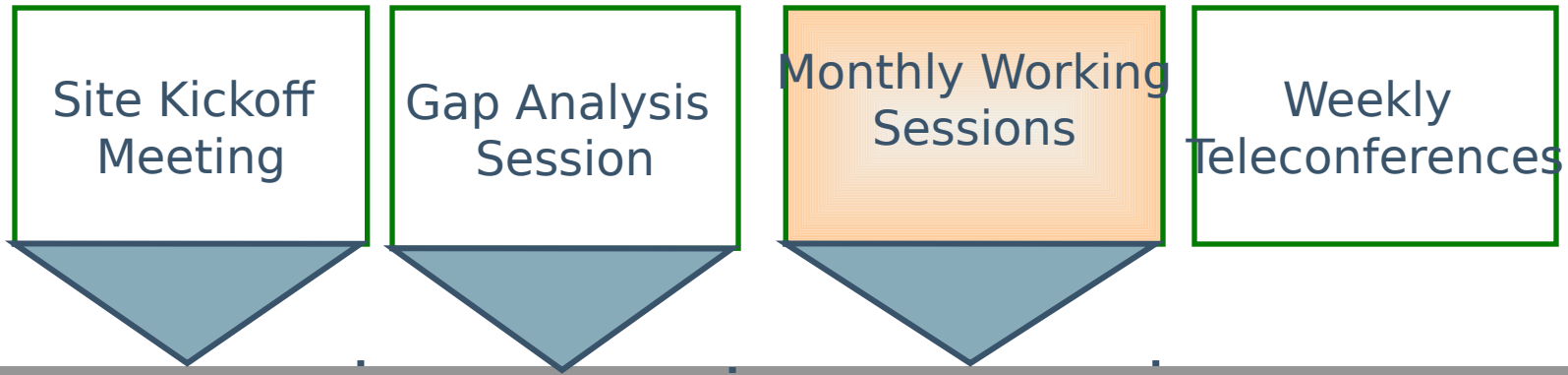
Gap Analysis Session

Monthly Working Sessions

Weekly Teleconferences

- Captured "As-Is" process of selected Process Area for each participating project
  - Used PIIDS template (a job aid SCAMPI appraisers use) to document current process
- Analyzed gaps in each of the selected PAs
- Created detailed assignments for follow-on work – pilot projects assigned to take a first cut at defining processes/procedures to fill gaps

SME-Pilot Events/Activities



- Monthly Face-to-Face sessions with whole team present
- Provides additional/continuing help/guidance to work through actions
  - Assisted in development of PI Action Plan
  - Provided tutorial on writing processes/procedures
  - Provided feedback on reviewed material

SME-Pilot Events/Activities

Site Kickoff Meeting

Gap Analysis Session

Monthly Working Sessions

Weekly Teleconferences

- Weekly teleconferences keep the project progressing
  - Review Action Items
  - Provide feedback if needed on recently reviewed material
  - Provide guidance on any issues/problems encountered

Company Overview

Analytical Services, Inc. is a provider of management, technical, information technology, and organizational and professional development products and services to government, commercial and international customers

- Incorporated in 1992, 8(a) Status 1995-2004
- Hispanic, Woman-Owned, Small Disadvantaged Business
- Over 250 total Employees & Growing – Headquarters in Huntsville, Alabama *(~100 employees at HSV site, primary focus for the pilot)*
- 3 remote offices: Montgomery, Al; Vicksburg, Ms; Shalimar, Fl
- Top Secret Facility
- ISO 9001:2000 Registered 16 April 2003

Core Capabilities

Primary capability/market areas:

- Information Technology
- Engineering and Scientific Analysis
- Systems Engineering/Program Management
- Professional and Organizational Development

Corporate Overview--Cirrus

- Cirrus Technology Inc. (CTI)
  - Incorporated May 1998
  - Headquarters: Huntsville, AL
  - Satellite offices at: Ft Rucker; Ft Bragg; Warner Robins, GA; Atlanta, GA; Ft Belvoir; Eglin AFB; Crystal City & Hampton, VA; Rock Island, IL; Albuquerque, NM; Langley, VA (AFB & NASA); Patrick AFB; Buckley AFB; MacDill AFB

Certifications

- Small Business
- Small Disadvantaged Business
- 8(a)
- HUBZone
- Service Connected Disabled Veteran Owned

CTI
Cirrus Technology Inc.

Corporate Capabilities

- Logistics
- Engineering
- Manufacturing (ISO 9000 compliant)
- Test & Evaluation
- Information Technology
- Security
- Intelligence
- Support Services

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Possible Future Events

Things that have been discussed as possibilities to involve Huntsville regional stakeholders and small businesses outside the region (none of these have been finalized):

- A special offering of SEI 3-day Intro to CMMI course to a general audience that includes small business implementation information for the Process Areas that were exercised in the two pilots
- A regional workshop associated with SE2 2004 to disseminate the approaches and lessons learned from the pilots (this has been accepted by the program committee)
- Formation of a regional consortium that would support a “virtual Engineering Process Support Group” for its members, enabling them to sustain a common infrastructure for process improvement without each one incurring the full cost